

SpotLight

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LAWRENCE LIVERMORE NATIONAL LABORATORY

THE PEOPLE
WHO DRIVE
OUR SCIENCE
& TECHNOLOGY

JOSÉ HERNÁNDEZ: FROM THE FIELDS TO THE STARS

RAD-ical LAB CLASSICS

THE AMERICAN LAB

WELCOME TO SPOTLIGHT

Welcome to the latest edition of *Spotlight*, a look at the people who make up Lawrence Livermore National Laboratory. This issue dives into the life of José Hernández, a farmworker turned astronaut, who donates much of his time to aspiring young dreamers. Our center spread looks at what inspires some women around the Lab to drive and restore classic cars. And Director Emeritus Bruce Tarter talks about his journey into the book-writing field with the publication of his seminal work: “The American Lab.”

We hope you enjoy this issue of *Spotlight*. We'd also like to hear from you. Send us your thoughts and suggestions, whether it's what you like — or even if you don't — about this magazine, or if there is something you would like to see in coming editions. You can reach us at pao@llnl.gov.

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ABOUT THE COVER

Former Lawrence Livermore National Laboratory engineer and NASA astronaut José Hernández travels around the world through his Reaching for the Stars Foundation, speaking to fifth-grade students about setting goals and reaching them through hard work and determination. In June, Hernández visited Marilyn Avenue Elementary School in Livermore to talk to students, some of whom were children of migrant farmworkers like himself, urging them to seek higher education in science, technology, engineering and math (STEM).



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SpotLight THE PEOPLE WHO DRIVE OUR SCIENCE & TECHNOLOGY

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From the fields to the stars

LAB ENGINEER-TURNED-ASTRONAUT NEVER FORGOT HIS ROOTS

It was a chilly December night in 1972. Under a tawny half-moon hovering over California's Central Valley, an impressionable 10-year-old boy named José Hernández looked skyward and saw his future.

*By Jeremy Thomas,
LLNL*

Hernández had spent that evening with his family as they gathered around their black-and-white television. Young José, a fan of "Star Trek," performed his usual duties as his father's remote control and human antenna. But this night was special. As Hernández, rabbit ears in hand, contorted himself to provide the best quality picture he could muster, he watched, upside-down, the grainy images of NASA astronaut Gene Cernan walking on the moon, the last human to do so. As newsman Walter Cronkite narrated the scene, Hernández gazed at the snowy screen, transfixed, feeling as if the signal coursing through his body was somehow programming his destiny.

"I stayed there for a good 20 minutes until my family had their fill, and they finally allowed me to let go of the antenna," Hernández recalled. "Then I was sitting in front of the TV with a fuzzy picture, and I'm going in and out of the house, looking outside and seeing the moon and coming back inside and hearing [Cernan] talk to Mission Control. I was in awe. I thought, that's what I want to be. I want to be him. I want to be an astronaut. That's how the dream was conceived."

The moment proved to be more than just a flight of fancy — it started a trajectory that would take him from his family's two-bedroom apartment in Stockton to Lawrence Livermore National Laboratory (LLNL), to the zero-gravity of near-Earth orbit and to the White House. The son of migrant farmworkers, Hernández grew up toiling in the fields, picking grapes, cherries or whatever produce was in season. His youth was spent following the harvest, journeying back and forth between California and Mexico. Born in French Camp, Hernández relocated with his family every few months, finally settling in Stockton at the urging of his second-grade teacher. Hernández didn't learn English until he was 12, but he excelled at math and was determined the rest of his life would not be spent with his hands and knees in the soil.

"Even though my parents only had a third-grade elementary school education, they believed in education; they didn't want us to follow their lifestyle," Hernández said. "They would point to a bank manager wearing a suit and working in an air-conditioned building and say, 'You want to be like him, not like us.' And school was the key. I credit my parents with putting those values and expectations that college was what we had to do."

Rather than steer him away from his out-of-this-world ambitions, Hernández's father empowered him with a five-ingredient "recipe": decide what you want to be (which José had already done), realize how far you need to go, draw yourself a roadmap,

After 11 rejection letters, former Lawrence Livermore National Laboratory engineer José Hernández, the son of migrant farmworkers, was selected as a NASA astronaut in 2004. He became the flight engineer for a mission on the space shuttle *Discovery* in 2009, where he helped resupply the International Space Station. He retired from NASA shortly after to pursue consulting work, motivational speaking and to start his Reaching for the Stars Foundation, which encourages youth to pursue STEM careers.





Dad's **Five-Ingredient Recipe**

- 1 Decide what you want to be.
- 2 Realize how far you need to go.
- 3 Draw yourself a roadmap.
- 4 Get a good education.
- 5 Do more than what people expect.



When Hernández told his father that he wanted to be an astronaut, his father was supportive, presenting him with a five-ingredient “recipe” for success. Hernández uses the recipe in his lectures as a blueprint for accomplishing goals. Hernández has added his own sixth ingredient: perseverance.

get a good education and always do more than what people expect. Hernández took the work ethic he had cultivated in the fields and poured it into his schooling, beginning a path to becoming an engineer as his older brother Salvador had done. Working at restaurants and canneries to pay his tuition, Hernández attended the University of the Pacific and earned a degree in electrical engineering and a master’s from the University of California, Santa Barbara.

First introduced to LLNL on a visit to the Discovery Center while in elementary school, Hernández eventually joined the Lab as an intern in 1984. With his astronaut dream firmly rooted, Hernández looked for opportunities to add skills to his resume that would get him closer to fulfilling his destiny. He worked on an X-ray laser that would be deployed to space, part of the “Star Wars” Strategic Defense Initiative (SDI) program. Then he tackled a project to build the first digital mammography system for early detection of breast cancer. He became a group leader in Chemistry and Materials Science and served as president of Los Amigos Unidos, the Lab’s Hispanic activities group. When he had the opportunity to go to Russia as part of the highly enriched uranium purchase agreement, he jumped at it and began learning to speak Russian, knowing that future NASA missions would require Russian collaboration.

In 1992, Hernández applied to become a NASA astronaut, the first of what would be many unsuccessful attempts. He framed his initial rejection letter as motivation, but after the sixth, he crumpled it up and angrily threw it on the floor, convinced he was giving up his pursuit for good. Instead of conceding defeat, Hernández began to study the qualifications of previous classes of astronauts. He took flying lessons at the Tracy airport and earned his pilot’s license. He saw most astronauts also had scuba training, so he joined the Lab’s Vaqueros del Mar scuba club and became a certified diver.

“What kept me going was the fact that everything I was doing was helping my career at the Lab, so I didn’t feel like I was wasting my time,” Hernández said. “I thought, ‘Just keep doing what I’m doing, as long as it’s not affecting my career, I’m OK. I’m moving in the right direction.’ I liked the pace I was moving at the Lab career-wise, so I wasn’t stagnating. Everything was working out.”

In 1999, Hernández went to Washington, D.C. on assignment at the Department of Energy headquarters. He joined the Nuclear Material Protection Control and Accountability program, initiated to help the Russians control and protect their nuclear material. Though the rejections as a NASA astronaut candidate continued, eventually the agency offered him a job as an engineer. Sensing his dream about to be realized, Hernández took a pay cut and a leap of faith, relocating to the Johnson Space Center in Houston in 2001. After 11 straight snubs, his tenacity finally paid off. In 2004, at the age of 41, Hernández finally got the call he’d been waiting for, the one welcoming him to the 19th class of NASA astronauts.

“I was so happy,” Hernández said. “I remember when I left, the Lab was kind enough to say, ‘We’ll put you on leave without pay and when you’re done playing, you can come back.’”



After his selection among the 19th class of NASA astronauts, Hernández was off for two years of training before his two-week mission in space aboard the space shuttle Discovery, on a mission to resupply the International Space Station, where he assisted on spacewalks and repairs, operated the shuttle's robotic arm, installed equipment and experiment modules and helped dock and undock the shuttle from the space station.

LLNL physicist Harry Martz, director of the Lab's Nondestructive Characterization Institute, worked with Hernández applying nondestructive evaluation to materials for the SDI program. Martz has stayed in touch with Hernández over the years, and recalls being impressed with his hard work, tenacity and optimistic attitude, even in the face of repeated disappointment.

"Sometimes people say certain things and you think 'Yeah, whatever.' And when he didn't make it the first few times you thought, 'Well, it's probably over, he's not going to do it.' But he just had that drive, that perseverance to keep trying and not accept failure," Martz said. "A lot of people get rejected and they get all depressed, but he looked at it like 'At least I got a letter from NASA and that's a start.' He was very creative to think, 'What do these other astronauts have that I don't have, and I have to do these things.' He put all these things together, so it was hard for NASA to refuse him."

Up, up and away

Officially an astronaut candidate, it was on to flight school in Florida and then to Houston for two years of basic training. Floating in pools with mockups of the space shuttle and sections of the International Space Station, Hernández practiced spacewalks under water and got accustomed to wearing spacesuits in zero gravity. After earning his wings, he was selected as the flight engineer aboard the space shuttle Discovery on a two-week mission to resupply the International Space Station (ISS). Following 18 more months of grueling training, close to midnight on Aug. 28, 2009, Hernández' lifelong ambition was finally realized, as Discovery launched from Cape Canaveral on a two-week mission.

"You go from zero to 17,500 miles an hour in eight-and-a-half minutes. Once the solid rocket boosters light up, you know you're going somewhere because you can't turn them off. When you're up there, 300 miles above the ground, you're going around the



Hernández initiates inspection of the space shuttle's thermal protection system, the heat-resistant tiles on the shuttle's underbelly and carbon material on the shuttle's wings and nose cone, using the shuttle's robotic arm.

world once every 90 minutes in a continuous fashion, and you're free-floating in a microgravity environment," Hernández said.

During the mission, an international collaboration involving astronauts from five other countries, Hernández assisted on spacewalks and ISS repairs, operating the shuttle's robotic arm, installing equipment and experiment modules and helping dock and undock the shuttle from the space station. He also was the first astronaut to bring an Oakland Raiders flag to space.

One of the first things he did in orbit was to view the planet from a perspective only about 550 humans have ever had. The experience permanently altered him.



"When you see it, it boggles your mind," Hernández said. "I couldn't make out where Canada ended and the U.S. began, or where the U.S. ended and Mexico began. I thought, 'I had to come here to realize that down there, we're really just one — that borders are human-made concepts designed to separate us.' I wish we could have our world leaders experience this a-ha moment like I had, because I guarantee you if we did that, our world would be a much better place than it is today."

His second takeaway came during one of the shuttle's 219 revolutions around the Earth, as it passed from the dark side of the planet into the light of sunrise.

"When the sun hits the horizon at the right angle you can see the thickness of our atmosphere, and you realize how scary-thin and fragile our environment is — that's when I became an instant environmentalist. I said, 'Man, they're right. This looks like a very delicate balance, and anything we do down there is going to affect the balance.' I can see where we can get to a point where it's a runaway problem and we won't be able to control it, and suddenly we've got an imbalance that can affect our climate and environment.

During the space shuttle Discovery's 14-day mission, Hernández operated the shuttle's robotic arm — also known as the shuttle remote manipulator system — which is used to move cargo, facilitate repairs and assist astronauts during their spacewalks.



I think we're seeing some of that already, and that's what really woke me up."

After 14 days in space, Hernández returned home, exhilarated and humbled by the experience. NASA had announced the end of the space shuttle program, and Hernández knew if he were to go back to space, it would come at a high cost. It would have to be aboard a Russian soyuz rocket, requiring four more years away from his family, much of it in Russia. With five children, Hernández felt it was time to move on to other endeavors.

Back on terra firma, but reaching for the stars

Like most returned astronauts, Hernández was given his pick of desk jobs at NASA, deciding on the agency's Office of Legislative and Intergovernmental Affairs. He was invited to a Cinco de Mayo event at the White House, where he met President Barack Obama in a photo-op lineup. Upon discovering Hernández was an astronaut, Obama asked him if he'd ever thought about running for Congress. Hernández was taken aback; the thought hadn't crossed his mind.

Not long afterward, Hernández was invited to Texas for a talk by Obama on immigration reform. Near the end, the president gave attendees a microcapsule of Hernández' life story. Again, Obama asked Hernández if he'd thought about running. Realizing Obama was serious, Hernández said he'd talk about it with his family. When Hernández received the Medallion of Excellence for Leadership and Community Service from the Congressional Hispanic Caucus Institute in Washington six months later, Obama was in attendance. Following the presentation, Hernández was escorted to the front of the line for a picture with Obama and his wife Michelle.

"It was this third time that he finally said, 'I'm going to stop playing around, I'm going to do the ask: Will you run for Congress?'" Hernández recalled. "At that point I figured that's

more of an order than a request. I thought it was my duty to salute the flag and I said 'Yes, sir.'"

With the end of the space shuttle program combined with the pressure to run for office, Hernández decided to leave NASA and begin a congressional campaign for the 2012 election. His only prior political experience was as student body president in high school, but Hernández felt he had a knack for politics. The downside was he couldn't run in his home district, which was already governed by an incumbent Democrat. He was moved over to California's 10th District, where he was pitted against the Republican favorite, Jeff Denham. Hernández lost by a slim margin.

"We did make some inroads, but it was a tough race," Hernández said. "Unfortunately, the cards weren't on the table, but losing the election was the best thing that could've happened, because I don't think I would've been able to get my kids through college on a congressman's salary."

It also freed up Hernández to become a consultant in aerospace and renewable energy, a job that took him around the world. He worked as a technical adviser for the Mexican government, which sought his help in selecting launch providers for three Boeing-built satellites. The three-and-a-half-year, \$1.2 billion project saw him travel to French Guyana, Kazakhstan and Florida to assist with rocket launches. He continues to consult with universities, including a college in Mexico where he helped create an aerospace engineering program. Students there are building a satellite that NASA will launch in 2019.

Along with Hernández' seat in the exclusive club of NASA astronauts came the inevitable fame, from throwing the first pitch at an Oakland A's game to appearing in a commercial for Modelo beer with his father. Though Hernández' journey took him far from the rural fields he grew up in, he's never forgotten his roots, capitalizing on his notoriety to influence a younger generation of students from underprivileged backgrounds, particularly in his hometown of Stockton, where



Following a speaking engagement at Marylin Avenue Elementary School in Livermore, Hernández signed copies of his biography “Reaching for the Stars: The Inspiring Story of a Migrant Farmworker Turned Astronaut.” His book has been translated into Spanish.



Hernández spoke to a group of Pedrozzi Young Scholars at Marylin Avenue Elementary in Livermore in June, telling the story of his journey from the fields to space and inspiring the fifth-graders to “dream big.”

he regularly engages in community events and science, technology, engineering and math (STEM) outreach.

“Mr. Hernández is an example of what I strongly believe: Talent is universal, but opportunities are not,” said Stockton Mayor Michael Tubbs. “Our communities have an abundance of smart, talented and resourceful individuals that just need an opportunity to succeed in life. Mr. Hernández started from humble beginnings and now he has reached the stars. He is an example for all of our youth that with hard work, you can become anything you want to be.”

Sparked by the excitement he saw generated at home after his astronaut selection, he founded the Reaching for the Stars Foundation (Astrojh.org) in 2006 to motivate children in the Central Valley to pursue STEM-related careers. Once a year, more than 1,200 fifth graders are provided with a single-day, hands-on science class. Middle and high school students can take a five-week summer academy at the University of the Pacific to expose them to college math and science curricula. The foundation also awards scholarships to graduating seniors.

Hernández’ foundation has partnered with his alma mater, the University of the Pacific (UOP), on the Prep USA-Reach for the Stars Academy, a summer program that allows promising middle and high school students to visit the university for STEM instruction, as well as the Science Blast Community Day, which provides hands-on education to students in San Joaquin County. Hernández regularly speaks at on-campus STEM events and graduation ceremonies and has served as a member of UOP’s board of regents.

“José is wonderful part of our community,” said UOP President Pamela Eibeck, who also is an engineer. “As an undergraduate, he was part of our Community Involvement Program, which provides scholarships and support services to first-generation students from the Stockton area. But the true sign of his potential became evident when, after being rejected by NASA 11 times, he persisted until he was selected as a mission specialist. José is a powerful

example of perseverance for anyone who is willing to look beyond what is and see what is possible. We’re grateful that he returns to Pacific often to share his story and encourage younger generations.”

In addition to authoring the book “Reaching for the Stars,” which was translated into Spanish, Hernández has spent much of his time traveling throughout the country and internationally as a motivational speaker, talking to educators, industry, and particularly students, encouraging them to set ambitious goals. Motivational speaking, Hernández said, came to him quite by accident.

“When I came home, I saw the impact I had on the community and especially the kids,” Hernández said. “I immediately recognized that I was a role model, whether I wanted to be or not. It seemed like I had lightning in a bottle; people were actually listening. It kind of happened without me wanting it to, but it’s seemed to work out pretty well.”

“The message I want the kids to come away with is that it’s OK to dream big,” he continued. “At the same time, I also tell them you’ve got to work for it, so I give them the recipe and the tools to convert that dream to reality.”

Hernández is considering another congressional run in his home district (CA-09) as early as 2020. All of his five children are still in school. Two daughters are in college; one is a senior at Loyola Marymount studying business management and another is a junior at UC Santa Barbara in actuary sciences. His oldest son Julio, who also wants to be an astronaut, spent two summers working at the National Ignition Facility and is pursuing a Ph.D. in aerospace engineering at Purdue University. His youngest son, who is still in high school, wants to be an engineer. Another daughter has special needs and is in an adult transition school.

RAD-ICAL LAB CLASSICS

By Anne M. Stark, LLNL

With their shiny chrome and polished paint, Diane Cuyle, Jill Farrell and Marla Vega can't remember a time when cars weren't a part of their lives. And while restoring or driving classic cars is often mistakenly equated to a man's hobby, these Lab women find their classic cars are near and dear to them. Here is a sampling of Lab women who restore, race and adore their oldies but goodies.





Marla Vega drives the 1954 Bel Air in front of the Duarte Garage and Lincoln Highway Museum in Livermore. The museum is a restored 1915 garage on Portola Avenue, which used to be called the Lincoln Highway.

A DREAM COMES TRUE

As the supervisor of the Security Division's Central Alarm Station at Lawrence Livermore National Laboratory, Marla Vega's days, and sometimes nights, are busy.

But when she's not at work her fun happens in the form of a 1954 Chevy Bel Air.

The turquoise beauty was her husband's dream car. When he retired about 18 months ago, he was determined to find this classic from the '50s. Vega was on board from the beginning.

They happened upon a car in Paso Robles that had been fully restored in 2004. They jumped on it in March 2017.

"We love sharing it with people and listening to their stories," Vega said. "They love reminiscing."

The Bel Air has won numerous awards in car shows around the Bay Area. Before the Vegas owned it, it was featured in *Low Rider Magazine* in 2004.

You could say that Vega has cars in her bloodline. Her grandfather was the personal mechanic of a wealthy family in Scotland. Her father owned a car dealership. And she's been going to hot rod and car shows since she was a child. "I've been a car kid my entire life," she said.



Marla and Armando Vega won the Vintage Classic award in a Danville car show



At left, Vega's grandson Maddix showing off the Bel Air.

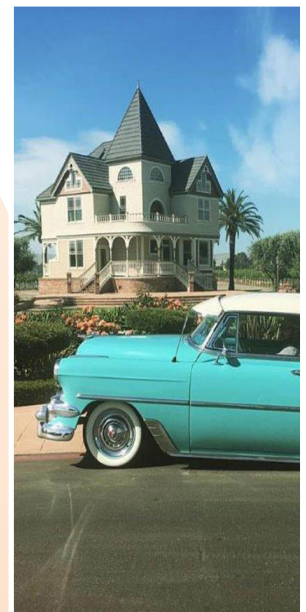
Her first car was a 1959 Volkswagen Bug that she bought for \$150 — and it actually ran. She drove that car for years as a teen until she found a 1967 Chevy Camaro. “I did some restoration and my dad and I built the engine. I was disappointed when I sold it.”

But with the Bel Air part of the family, Vega can't get enough. Her husband drives it two to three times a week and the couple take it out on weekends to car shows and even on a “date night” or two.

“We have a lot of fun with it,” Vega said. “It’s a show stopper. We’ve met so many people that we would have never met otherwise because they want to stop and talk about the car.”

The Bel Air has had a therapeutic effect on Vega. “It’s my disconnect from my job and family obligations. Cars evoke these fun, fond memories for people.”

And for her next car, Vega said she would love to have another vintage Camaro. “It would cost me a fortune, but if I did find an old Camaro, I’d buy it in a heartbeat.”



The 1954 Bel Air in front of Concannon Winery in Livermore, where Vega married her husband Armando five years ago.



Jill Farrell's 1960 Austin Healey in the Altamont Cruisers show in 2015.

Farrell's father teaching her eldest daughter to drive in the 1960 Austin Healey.



PASSING THE TORCH

Before Jill Farrell was a gleam in her parents' eyes, her father had a secret passion: a 1960 Austin Healey 3000 British sports car.

"But when I came along, they realized it wasn't really a family car and sold it," said Farrell, Lawrence Livermore's deputy director for strategic infrastructure. "But as my sister and I were growing up, he longed for that car."

So he bought a similar Austin Healey, though that one was in shambles and basically a chassis and engine, neither of which looked very good. Farrell's father had the vehicle restored as a daily driving car, rather than a showpiece.

"I learned to drive in that car, manual transmission and all, and it became my school car," Farrell said. Driving a classic car in high school may seem like a way to draw attention, but not for Farrell: She was excited to have any car. "I didn't stand out as the cool kid in class. This was just a functional car."

Upon high school graduation, Farrell's father passed the car down to her younger sister, who also learned to drive in the Healey and drove it to high school. Once her sister went off to college, their father decided to restore the car again. This time back to its original color: Florida green with an old English white racing stripe, and he changed the upholstery to white.

Her parents joined a few car clubs and would drive it for day outings. But when her father was diagnosed with Alzheimer's disease and could no longer drive the car, he told Farrell to store and maintain the car with one condition: teach her then eldest 15-year-old daughter how to drive using the Austin Healey. Now

she is teaching her youngest daughter to drive it, too.

Farrell has entered the car in a few shows where it has won awards including Livermore's Altamont Cruisers car show (where she got to parade it down First Street), the LLNL vintage car show and the All British Motor Show at the Blackhawk Museum.

Farrell intends to keep the Healey in the family.

"It's our family car," Farrell said. "I'm holding on to it. The intent is it will go to my sister, who has two daughters, and she'll use it to teach her two daughters to drive."

Farrell at the LLNL car show.



At 16, Farrell's first day of driving to high school in 1981.



Diane Cuyle shows off what's under the hood of her 1972 Datsun 510.



Cuyle and her husband Jim fully restored her 1972 Datsun 510 in nine months.



Cuyle races the Datsun 210 in time trial competitions.

IT'S ALL IN THE FAMILY

Diane Cuyle remembers at 3 years old, the 1950 MG-TD British car that sat in her parents' garage waiting for a full restoration. From 1975–1982, her dad, with her mom alongside him, restored the car to mint condition.

From there, they went on to an MGB and then on to MG Sprites.

So to Cuyle, an industrial hygienist at Lawrence Livermore National Laboratory, restoring vintage cars was just “normal.” And when it comes to racing old cars in time trials, it's all in the genes.

“Racing is in my blood,” she said. “My great-grandfather raced motorcycles and midgets, and my husband's grandfather raced motorcycles.”

Her baby is a 1972 Datsun two-door 510. “She,” as Cuyle calls the car, was a full restoration that she and her husband Jim completed in nine months. They entered the car in many shows and earned three different awards, including a “Best in Show.”

But after buying a house and raising a family, the car just sat and never quite ran right, so the Cuyles sold it. By 2007, the Cuyles decided to get back into restoring Datsuns. They found a broken-down version of what her car looked like for \$500 at a swap

meet. “I put my hand on the car and said, ‘This is my car.’” As it turns out, it was the same car she had sold in the mid- '90s.

“Each car has a soul and they'll talk to you,” she said.

This time around, it was time to supe up her baby, which she named “Tink” (for Tinkerbell), with coil over suspension, disc brakes, an air intake manifold, a larger exhaust system and beefier wheels. However, Tink is still a lady all around, according to Cuyle. She has earrings hanging from her rear-view mirror and jewels on the heater controls, not to mention the Tinkerbell floor mats. “She's got an attitude just like her mama.”

But the Datsun isn't the only car Cuyle has taken on the track. She's also raced her husband's Infinity G35 and her Nissan 370Z. “When I first came to the track, I thought I was a badass driver, but after I got my rear handed to me, it was a very humbling experience.”

That inexperience and naiveté have disappeared. Cuyle is dedicated to honing her craft and making her best time every time she goes out. “It's a head game — you have to really focus.”

And her mantra when racing: “Brake late, turn late.” Because after all, that's how you win races.

TARTER: THE AMERICAN LAB

By Lynda Seaver, LLNL

For more than 50 years Bruce Tarter has kept Lawrence Livermore National Laboratory at the center of his life. Whether it was his days as an intern in 1962, his full-time employment as a theoretical physicist five years later, his rise up the management chain to his tenure as the eighth director, his years of counsel as director emeritus or now, as author of the Lab's first comprehensive history, Tarter has been passionate about how the Lab will be remembered.

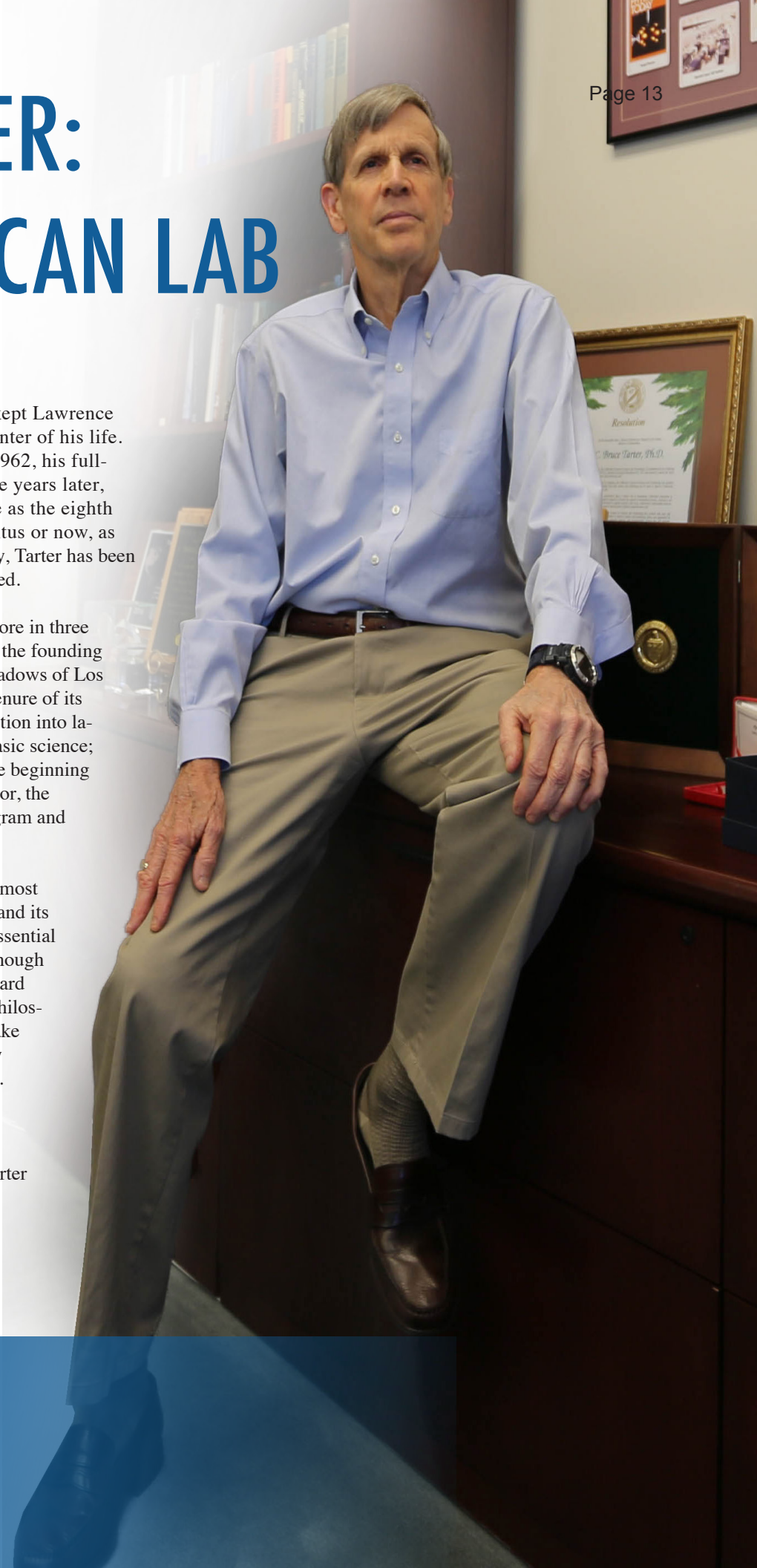
"The American Lab" presents Lawrence Livermore in three parts — starting with the dawn of the Cold War, the founding of the Lab and its struggle to break out of the shadows of Los Alamos and Lawrence Berkeley labs; onto the tenure of its sixth director, Roger Batzel, and the Lab's evolution into laser science, energy, environment, biology and basic science; and concluding with the end of the Cold War, the beginning and end of Star Wars, Tarter's own turn as director, the establishment of the Stockpile Stewardship Program and the Lab's transition to a new contract manager.

Throughout his career Tarter crossed paths with most of the people who were instrumental to the Lab and its history. He believes LLNL stands as "the quintessential American Laboratory," hence his book's title. Though often equated to the vision of the European Edward Teller, one of the Lab's co-founders, the Lab's philosophy and approach are linked directly to namesake E.O. Lawrence, who embraced multidisciplinary teams, evolving technology and audacious ideas.

"It is a place few outsiders came to love, though many respected its level of achievement," Tarter said. That respect for the Lab is the takeaway Tarter wants his readers to achieve.

His book looks at the many ways the Lab worked to shape national security, from the first submarine-launched ballistic missile,

Bruce Tarter recently published
"The American Lab: An Insider's
History of the Lawrence
Livermore National Laboratory."



to its pathfinding days in laser science, computational science and biotechnology, and onto its entry into nonproliferation and detection technology. Along the way Tarter offers anecdotes and personal observations about the people who shaped Lawrence Livermore's history, as well as musings about the Lab's various twists and turns, the ways of Washington and even his own management style.

His presentation is straightforward — he doesn't gloss over Lab controversies such as the loss of programs or funding to other labs, and he doesn't hesitate to point a finger of blame at myriad Lab leaders, including himself. Tarter uses these as defining moments when the Lab learned to switch direction and emerge as a leader in other areas of science.

"There are very few institutions that live 50 years or more," Tarter said. "The Lab always has been able to reinvent itself."

Tarter wants the public to see the Lab as "an institution that embraced technology with a fervor and was at the heart of many of the revolutions of the second half of the 20th century." His book chronicles the Lab as a clearinghouse for personnel who would emerge as prominent leaders in technological, scientific and national security establishments.

Yet Tarter makes it clear he is not trying to position his Lab as better than the rest — he just wants people to see the many ways the Lab has shaped science and technology.

The genesis for "The American Lab" came at the twilight of Tarter's tenure as director in 2001. Back then he was overseeing the organization of the Lab's 50th anniversary events, and the historical documents and oral histories he came across piqued his interest. After stepping down as director in 2002, he set about writing "some sort of working history," but how it should be organized remained elusive.

"There were no written histories about this Lab," Tarter recalled. All the other labs had historical works, but what Tarter found on Livermore were mainly "newspaper-like summaries." So he set about collecting various documents or conducting his own oral histories, enlisting research and editing help from former Internal Communications Manager Carol Gerich, former archivist Maxine Trost, Paul Chrzanowski of the Director's Office and former senior manager Bill Lokke. Those efforts are stored away in a little-known archive on the ground floor of the Director's Office — an impressive collection that rivals the morgue of any metropolitan newspaper.

"It was a lot of work to put that together and it offers quite an extensive history of the place," Tarter said.

He used that archive to write up the Lab's first 20 years, but put the book aside to take up positions on various task forces and committees, at the behest of the various directors who succeeded

him. In 2012, he returned to the book in earnest, choosing at first to present a personal memoir, but eventually turned to a comprehensive history.

"There are so many things the Lab has done well," he said.

Tarter is the first to admit his book is written with Laboratory employees in mind: those who are interested in science and keen on national security and the geopolitics of nuclear weapons. The description could be of Tarter himself.

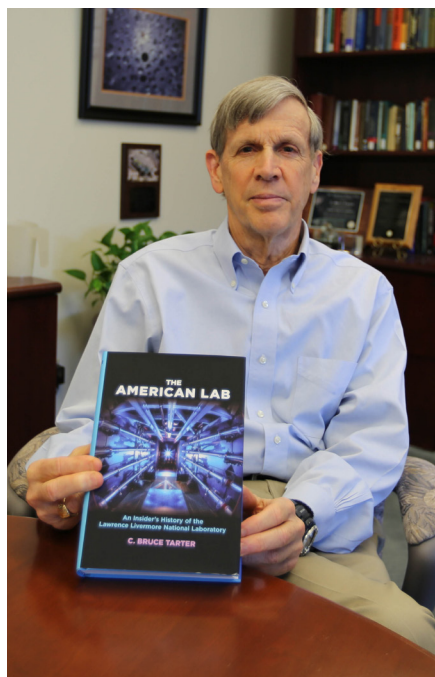
At the time he submitted his work for consideration, Tarter had perfected the first section of the book only. The rest was a rough outline. Once a publisher (Johns Hopkins Press) expressed interest, Tarter worked toward completion.

He mocks the uncharacteristic approach he took when he set about writing. He recalls the pages of charts, spreadsheets and graphs he concocted as he outlined how his book should play out, designating a set amount of pages for each section. As he neared his self-appointed limit, he began to edit and scale back.

"Only a physicist could come up with this approach," he joked. He admits the results sometimes eliminated "some of the fun" — meaning the gossipy anecdotes — but then adds there are periods in the Lab's history "that just aren't sexy anyway — not even to scientists."

Now that the book is complete and hitting the stands, Tarter will spend the next several months promoting it. He will give a talk at the Lab as well as some public presentations, including book signings. He looks forward to returning to former pursuits, among them golf, travel and enjoying music.

Prior to choosing physics he was a bassoonist considering a full-time career in music. He turned to science when he realized "I might reach No. 1 in a symphony like Kansas City, but never San Francisco. I'm the kind of guy who's always been the best bassoonist out on the golf course, and the best golfer in the orchestra."



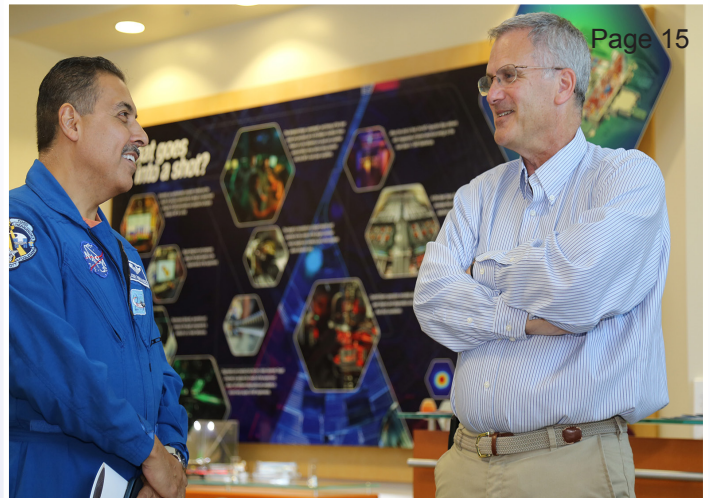
"The American Lab" is available through Johns Hopkins Press (use code HTWN) or through Amazon.

Continued from page 7

With all he's accomplished, Hernández said he still considers himself a "Labbie" at heart. He stays in touch with former co-workers and friends he made through Los Amigos Unidos. He maintains a family connection to the Lab, too. His nephew, Gabriel Corona, works in the Life Extension Program.

When he drives by the Lab, Hernández said he remembers the luncheons, the retirement parties and all the miles he ran on the surrounding roads and trails. He hopes to consult on Lab projects in the future, and said he has nothing but fond memories of his 15-year Lab career, crediting it with providing him with the experience he needed to achieve his goals and the opportunity to perform his most impactful work.

"I look at working at the Lab as one of the highlights of my career," he said. "If I look back at everything I've done, people probably think I'm most proud of being an astronaut and going to space, but quite the contrary. What I'm most proud of is the fact that the Lab embraced the digital mammography project; the work Clint Logan, Laura Mascio Kegelmeyer and I did allowed us to assist a private company to make a product that was better



During a recent visit to the Laboratory, José Hernández toured the National Ignition Facility with another former astronaut, Jeff Wisoff, who is the principal associate director of NIF & Photon Science.

than what was available at the time. I look back and know that project has saved lives. That is what makes me most proud."

The NASA/LLNL connection

Though he may be the most recent example, José Hernández isn't the only Lawrence Livermore Lab employee with ties to NASA's astronaut program.

The first astronaut selected while working for the Lab was Leroy Chiao, who attended Monte Vista High School in nearby Danville. After receiving his undergraduate degree from the University of California, Berkeley and his Ph.D. from the University of California, Santa Barbara, Chiao joined LLNL in 1989 as a chemical engineer, processing aerospace composites.

The following year, NASA selected Chiao as an astronaut candidate. He officially became an astronaut in 1991 and participated in four NASA missions, beginning in 1994 as a mission specialist, commander and a science officer. After logging nearly 230 days of spaceflight, including 36 hours of spacewalks, Chiao retired from NASA in 2005. He co-founded and serves as CEO of OneOrbit, a company providing corporate keynotes, workshops and school programs based on science, technology, engineering, arts and mathematics (STEAM) and character-building. He also performs consulting work, executive coaching and, like Hernandez, is a motivational speaker.

"I very much enjoyed my time at LLNL. The people, environment and freedom there fostered creativity and productivity, strengths that I brought with me to NASA," Chiao said. "My prior experiences helped me to achieve a successful and enriching career as an astronaut."

In 2001, husband and wife astronauts Peter "Jeff" Wisoff and Tammy Jernigan left NASA to join the Lab. Wisoff landed at the National Ignition Facility (NIF) and Jernigan became the principal deputy associate director of Physics and Advanced Technologies.

NASA selected Wisoff in 1990 and he became an astronaut in 1991. He flew four NASA missions from 1993 to 2000, logging a total of 42 days in space and taking three spacewalks totaling almost 20 hours. During his missions, he delivered supplies to the Russian space station Mir, retrieved the European Retrievable Carrier Satellite, conducted science experiments in space and helped construct the International Space Station. Wisoff and Chiao flew together on Wisoff's last mission in 2000. Wisoff is the principal associate director for NIF and Photon Science.

"One of the most satisfying experiences working at NASA was being part of a great technical team working on hard missions that could only be achieved by a commitment to excellence," Wisoff said. "That same level of challenge and commitment is at the heart of everything we do at LLNL."

Jernigan flew on five space shuttle missions between 1991 and 1999, logging 1,512 hours in space. During her last mission, she performed a spacewalk for approximately eight hours. In addition to her space flight experience, Jernigan served as NASA's deputy chief of the Astronaut Office and as deputy for the Space Station Program, where she developed and advocated Astronaut Office positions on the design and operation of the International Space Station. She serves as senior adviser to Laboratory Director Bill Goldstein.

"During my tenure at NASA, I served on the Physics and Space Technologies Directorate Review Committee and was impressed with both the quality of the workforce and the important work done at the Lab," Jernigan said. "When it came time to retire from the Astronaut Office, I decided to make a career here at LLNL and join this group of amazing people who make such critical contributions to our national security."

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